Material Doubts

The Consequences of Plastic

Jeffrey L. Meikle

Natural limits of wood, stone, and metal long made it hard to conceive of material desires beyond the traditional. That situation changed in the twentieth century when chemists learned to synthesize and specify the properties of substances that had never before existed. Seventy years ago, the makers of Bakelite, the first synthetic plastic, called it "the material of a thousand uses" and used the mathematical symbol of infinity as a trademark. Today, much of the stuff of everyday life is molded, extruded, foamed, stamped, vacuum-formed, or otherwise fabricated from plastic. We live and work with machines, appliances, and furnishings whose appearances and tactile qualities would have seemed unnatural to our ancestors. Objects of plastic have so proliferated that we take them for granted. Plastic has been naturalized.

Baby boomers grew up while plastic was expanding into their lives. Before World War II, consumer plastics were limited to such things as celluloid dresser sets and Bakelite radios. Publicists for the new industry in the 1930s predicted a utopia molded from cheap "miracle materials," and wartime mobilization stimulated a quantum leap in the production of plastic. Afterward, baby boomers played with Wham-O hula hoops and frisbees, Barbie dolls and Revell airplane models, Lego blocks and Mattel machine guns. They ate breakfast at Formica dinettes, spilled milk from polyethylene tumblers onto vinyl floors, and left for school clutching disposable Bic pens. Their families experienced a proliferation of new plastic products—Tupperware, garbage pails and laundry baskets, Melamine dishes, appliance housings, Saran Wrap and dry cleaning bags, picnic coolers, scuff-proof luggage, Naugahyde furniture, Mylar recording tape, Corfam shoes, shrink-wrapped meats, styrofoam egg cartons, artificial Christmas trees, and endlessly on. The "people of plenty" consumed an ever-increasing quantity of plastic as they experienced what *Time* referred to as a "flood of new products . . . transforming . . . the American way of life."[1]

The word *plastic* entered the folklore of the baby boom generation as its earliest members were coming of age. Millions of moviegoers watched in 1968 as

Dustin Hoffman received words of advice and the secret of worldly success from a family friend in *The Graduate*: "I just want to say one word to you. Just one word . . . Plastics . . . There's a great future in plastics."[2] This pronouncement convulsed viewers, most of whom would have had trouble explaining why. Some perceived a comment on the banality of business, others an attack on middle-class materialism. A few, catching an ominous note, entertained fleeting thoughts of science fiction nightmares, of technology run amok. Some merely relished the absurd elevation of the commonplace. Whatever the reasons, the scene hit an uneasy nerve and entered communal memory.

Plastic, by its very nature, complicates efforts to think about it. Able to assume many degrees of shape, texture, hardness, density, resilience, and color, the myriad varieties are united only by a word—*plastic*—that has defied most attempts to promote specific trade names. What do we mean when we talk about plastic? Is it a material capable of shaping the limits of history or is it an amorphous substance passively receptive to any psychological or cultural projection? The mythology of *le plastique* intrigued Roland Barthes more than ten years before *The Graduate*'s release. When the French critic's short essay on plastic was translated in 1972, it echoed the nervous discomfort of moviegoers at the invocation of "plastics" in a scene with no obvious context. Barthes suggested that plastic was nothing without context; at the same time, it threatened to dissolve context. It was, in fact, everything and nothing. Written as a meditation on a trade show where Barthes observed perfectly formed novelties emerging from an injection-molding machine, his essay had plastic fulfilling the promise of medieval alchemy by bringing about "the transmutation of matter." Unlike other materials, plastic was "more than a substance." It embodied "the very idea of . . . infinite transformation" and triggered amazement at "the proliferating forms of matter." With its protean capabilities, plastic evoked "the euphoria of a prestigious free-wheeling through Nature." Eventually, plastic's freedom to become anything would reduce everything to nothing by dissolving all differences. With plastic as a universal solvent, Barthes observed, "the hierarchy of substances is abolished: a single one replaces them all: the whole world *can* be plasticized."[3]

Celebrating the centennial of plastic in 1968, even as *The Graduate* played in movie theatres across the country, the industry's trade association placed a twenty-page advertising section in the *New York Times*, boasting that new plastics contributed "a fluidity, a grace, a technological beauty of line and purpose that is sure to become the hallmark of a new way of life and a new American culture."[4] The Society of the Plastics Industry (SPI) also appointed a glamorous "Princess of Plastics" to make public appearances around the country and grant interviews to reporters. These gestures ignored plastic's significance in a bitter debate about the expansive American way of life. While people used more plastic each year, its reputation steadily declined. By 1979, when the trade journal *Modern Plastics* ran a series of articles defending the industry, the magazine had given up trying "to change the image of plastics" among the general public. Instead it was merely presenting "the facts" for its professional readers to use as ammunition against family and friends who thought they ought to be "ashamed of working in such a

terrible business."[5] It seemed unfair. If critics had limited attacks to rational issues such as solid waste, toxicity, pollution, or depletion of energy reserves, the industry could have responded with facts and figures. But defenders were helpless against perceptions of plastic as a sinister presence embodying everything wrong with America.

Potential for this vague fear of plastic extended back to the 1920s when publicists celebrated new synthetic materials as magic products of alchemical wizardry rather than of rational chemical processes. By suggesting that organic wastes from the bowels of the earth could be transformed into wondrous shapes and colors, chemical utopians encouraged ignorance and fostered a feeling that some things are best left unrevealed. While their rhetoric encouraged people to regard industrial chemistry as a democratic source of limitless material plenty, its subtext hinted at a loss of control over forces of nature at the very moment of reaching to transcend them. For example, ordinary citizens expressed doubts while touring Du Pont's world's fair exhibitions of the 1930s. Some questioned the wisdom of trying to surpass nature. Others spread rumors about spinning nylon out of cadaverine from human corpses. Still others blamed nylon stockings for rashes, poisonings, and skin cancer. Despite a growing familiarity with plastic during and after the war, such fears occasionally reappeared, as in the case of a *Collier's* reporter whose visit to a chemical plant in 1947 gave her "the creeps" because the "unearthly" material it produced made her feel "man has something quite unruly by the tail."[6]

None of America's postwar intellectuals expressed more animosity toward plastic than Norman Mailer. "I hate to sound like a nut," he once said in a radio interview that reportedly blamed plastic for everything from pollution to drug addiction and blotchy skin. His opinions seemed gratuitously insulting to people who had dedicated their careers to the industry's progress. But his criticism appeared prophetic as harmful effects of synthetics came to light in the 1970s. A journalist opened an article on toxicity of vinyl chloride monomer by invoking his notorious colleague. "Not long ago, cancer and plastic were associated with each other only in the writings of Norman Mailer," he wrote, "where they serve as symbols of decadence and self-destructiveness in the high-technology society." But the situation had changed. With medical reports revealing a high incidence of liver cancer among vinyl workers, a symbolic association had become "real scientific fact." Mailer would have argued he was right all along.[7]

For more than two decades, Mailer conducted a hostile campaign against plastic. The first attack came in 1963, when he discussed nuclear apocalypse in a monthly *Esquire* column that explained the "existential" meaning of the Cuban missile crisis by referring not to proliferating nuclear weapons but to proliferating plastic. Speculating on the lack of rebellions and desperate orgies in the face of annihilation, Mailer concluded that "we gave our freedom away a long time ago." The era's lifeless conformity attained material embodiment in plastic. We had "divorced ourselves from the materials of the earth, the rock, the wood, the iron ore . . . we looked to new materials which were cooked in vats, long complex derivatives of urine which we called plastic." These new materials lacked

the "odor of the living . . . their touch was alien to nature." In a suggestive word, plastic had "invaded" all aspects of social life, much as the nuclear threat had invaded the macro level of politics, or radiation the micro level of biology. The result was "a world in which all could live even if none could breathe." The following month's column extended Mailer's analysis by shifting its context from the threat of annihilation to that of an insidious death in life whose miasma radiated from the totalitarian "plague" of modern architecture. "Everywhere," he wrote, "we are assaulted by the faceless plastic surfaces of everything which has been built in America since the war," all of it proliferating "like the metastases of cancer cells" and congealing in a "cancerous" environment where everything tends "to look a little more alike" and "a little less like anything very definite."[8]

To explain why plastic provoked Mailer is a difficult task. If traditional materials, those Mailer regarded as natural, retained a sense of earthly origin, then plastic was unique in retaining nothing of its raw materials' earthiness. Artificial surfaces, colors, textures, and odors bore witness to a dominant technocratic mentality of precision and efficiency. Plastic's odor especially offended Mailer. The olfactory sense most directly connected the human race to its natural or animal origin. Plastic's hygienic aura, its synthetic mocking of odors of illness and death, suggested a willingness to divorce humanity from its past, to cross a line into a fundamentally nonhuman artificial reality. The materials Mailer abhorred and dozens of other innovations in late-twentieth-century technology promised—or threatened—to liberate the human race from the millennia of its biological past. This potential transcendence chilled Mailer, but also so stimulated the grudging admiration of the former Harvard engineering student that he dedicated a book to meditating on it.

His ambivalence as a critic of technocratic society emerged in *Of a Fire on the Moon*, an account of the first lunar landing that focused on the technical systems whose complex orchestration and fail-safe duplications produced a result so predictable he could refer to it as "the event of his lifetime, and yet it had been a dull event." In the best tradition of the science reporter, Mailer translated reams of turgid public relations material generated by the Apollo 11 mission, but his account never strayed far from ideology and often veered into private demonology. A long passage arguing the empty rationality of the American corporation—the space program's patron and profiteer—segued into a plastic-wrapped description of an Apollo capsule's interior. There, all vectors of postwar development "came to focus in the bank of instruments eighteen inches over each astronaut's head as he lay in his plastic suit on a plastic couch—lay indeed in a Teflon coated Beta-cloth (laid on Kapton, laid on next to Mylar, next to Dacron, next to neoprene-coated nylon) space suit on his Armalon couch—plastic, that triumph of reason over nature!"[9]

That sentence's rush to peel back layer after synthetic layer of an astronaut's protective cocoon revealed Mailer's own synthetic syntax, but his ultimate critique of technocratic society came elsewhere in a passage whose climax directly invoked plastic. Looking from within the world of NASA and corporate America,

he predicted a "society of reason" based on "the logic of the computer." Its operatives would rely on drugs for "accelerated cerebration." Its secure control would require "inchings toward nuclear installation, a monotony of architectures, a pollution of nature which would arouse technologies of decontamination odious as deodorants, and transplanted hearts monitored like spaceships." Its environment would be artificial, Mailer suggested, "obviously . . . plastic, air-conditioned, sealed in bubble-domes below the smog, a prelude to living in space stations." In such a society "people would die . . . like fish expiring on a vinyl floor." Although his Manichaean ideology required an opposing "society of the dropouts, the saintly, the mad, the militant and the young" subsisting outside those plastic domes, it was the dominant plastic society, divorced from natural instincts, embarked on a cancerous expansion, that he envisioned in the space program as "the Wasp . . . emerg[ing] from human history in order to take us to the stars." Unless it was just a pose, plastic inspired in Mailer a private pathological dread that became public because he so effectively expressed it for an oppositional culture, for people who already sensed an uneasiness they could not articulate.[10]

Even publicists sometimes adopted an oddly alarmist rhetoric when generalizing about synthetics. An article on plastic packaging opened with a passage on "creeping plasticism" nearly worthy of Mailer. "The most levelheaded of men," it announced in 1967, "can begin to entertain the uncomfortable suspicion that plastics are taking over the world." Science fiction images of radioactive mutants and invasions of body-snatching pods glimmered within the title of another, more skeptical article from the same year, with its promise that "Encasement Lies in Wait for All of Us." That enigmatic phrase, actually referring humorously to the decorative embedding of objects in transparent acrylic, inadvertently recalled the dry cleaning bag tragedy of 1959, when about eighty infants suffocated in polyethylene film that unsuspecting parents had used as mattress covers or left within easy reach of tiny hands. Long before it became fashionable to dislike plastic, when new materials still exemplified modern progress, the crisis of "the plastic bag menace" revealed how tenuous was plastic's reputation, how tangled it was in an undercurrent of doubt about the future, and how vigilant the plastic industry would have to become in defending its image.[11]

When dry cleaners first began using bags of thin, transparent polyethylene film, the new product seemed yet another example of plastic's convenience. Du Pont boasted in 1956 that blankets "freshly cleaned and trimly wrapped in clear plastic" marked "one of the hottest promotions" ever run by New England's largest dry cleaning firm.[12] By 1958, makers of polyethylene film had sold one billion of the new bags, accumulating a gross income of $20 million. But that same year brought scattered reports that infants and toddlers were being suffocated by what Du Pont had once called "those handy plastic bags."[13] Public awareness increased in April 1959 as the American Medical Association commented on a report that four children playing with plastic bags had died in Phoenix. A local doctor speculated that polyethylene film charged with static electricity could "literally grab" a child "through electrical attraction to his face."[14] By the middle of June, when articles in the press reached epidemic proportion, the death toll exceeded fifty

children, most under six months old. At least seven adult suicides had utilized the plastic garment bag as a lethal device. Within the next six weeks, the press reported another thirty accidental deaths of children and ten more adult suicides.[15] The nation confronted a geometrically swelling death toll, a gruesome plague brought on not by natural disease but by artificial products of human technological ingenuity. The rhetoric of reaction to the tragedy exuded an irrationality suggesting people were responding to more than the obvious hazard. Within the industry, on the other hand, first responses suggested a cynical concern for protecting profits. Defenders of the industry blamed ignorant parents for allowing children access to a dangerous material, seemingly equating plastic bags with loaded guns. A Du Pont spokesman "blamed parental carelessness in the deaths" and argued that polyethylene film was "made and costed to be disposable." This buck-passing ignored the fact that the industry had promoted the bags as ideal for reuse at home. Du Pont's own announcement in 1956 had praised plastic dry cleaning bags as reusable, "as housewives have discovered." Shortly before the panic broke, *Modern Plastics* was still praising the bags because "they can be re-used by the customer." The industry chose to ignore its prior position, to maintain instead that reuse was misuse, and to blame parents for the tragedy.[16]

Press reactions blamed neither parents nor the industry, but instead aimed a furious assault at plastic bags themselves as entities of near demonic malevolence. According to one account, plastic bags were "murderous." Another, after mentioning that the menace had already "snuffed out" twenty children in other cities, announced that it had "struck today for the first time in San Francisco" when a local baby was "Killed By Plastic Bag." The *New York Journal* captured the tone of popular reportage when it declared that "an almost invisible peril hangs loosely over the helpless heads of the nation's infants." That approach was so common that the Society of the Plastics Industry felt compelled to insist there was no "mysterious built-in danger." Plastic bags did not "literally reach out to ensnare children." But this protest carried little weight because the plastic bag menace threatened a generation of parents who already feared loss of control over their children's survival. As an editor in Redwood City, California, pointed out, plastic bags killed far fewer children than cancer, which annually took about three thousand children under age ten. Already cancer deaths of some thirty children each year could be attributed to "fallout radiation" absorbed through the milk and vegetables that nourished them. Unlike the current epidemic of suffocations, these radiation deaths neither "excited nationwide reaction" nor sparked "alarms in press and legislatures." Instead they marked "just another chapter in a dreary story we do not want to listen to." In a few calm words this small town editor, meaning to downplay the scope of the plastic bag threat, had unwittingly suggested a submerged link to nuclear anxiety that gave the suffocation tragedy such poignant dread. A colleague at the *San Francisco News* more directly made the connection. His own editorial asked "How Many Must Die?" and ended with a direct reference to the antinuclear movement by exhorting citizens to "BAN THE BAGS!"[17]

To dramatize the threat, some newspapers posed models in cautionary photographs that occasionally suggested parental complicity. The *Santa Ana Register* staged a scene with a mother bending down to smooth a plastic bag over her own daughter. Even more appalling was a photograph run in Toronto featuring a three-year-old boy with a plastic bag clinging to his face. There was something fascinating about a human face in all its imperfect uniqueness wrapped in an imploding bubble of transparent plastic film. *Life* printed a photograph of such a face to caution against the hazards of plastic bags.[18] This bizarre full-page image represented the agonized face of Dr. Leona Baumgartner, director of New York City's Board of Health, hermetically sealed in a "Thin Bag of Death" whose puckered folds converged into her mouth and nostrils. "After 20 seconds inside clinging plastic bag," *Life* informed its horrified, fascinated readers, "Dr. Baumgartner gasps for breath, is near suffocation." This image, experienced directly on its own terms, conveyed an impression of an unnatural technological plague striking at random and isolating even mature victims, rather than of a danger that careful parents might anticipate and prevent. The plastic bag panic of 1959 reinforced an ambivalence about plastic, recalling an earlier fear that industrial chemists were violating the natural order in a Faustian urge to create "something new under the sun." As the panic receded, so did the conscious anxiety about plastic, but it left an unconscious residue that became stronger with the rise of environmental concerns in the late 1960s and early 1970s.

That the panic did recede was the result of timely action by the Society of the Plastics Industry, which spent one million dollars on spreading public warnings about the danger, on creating standards for thinner, less dangerous polyethylene film, and on lobbying state and local lawmakers across the country to avoid passage of a welter of conflicting regulations. The SPI emerged from the "plastic bag war" as a "nationally known organization" concerned with preserving plastic's good name among the general population.[19] In the meantime, the plastic bag episode had little effect beyond the lives of those people who had lost children. It became common knowledge to withhold plastic bags from infants and toddlers. Otherwise there remained only a residue of distrust of plastic, nothing to act on when making consumption choices but a vague memory all the same, recalled years later when triggered by more insistent ecological doubts. Even so, some people found more traditional reasons for questioning the virtue of synthetic materials. Plastic in its least innovative manifestations often seemed fake and shoddy. As the products of the mid-century consumer economy proliferated, so too did a negative image that had plagued plastic from the beginning.

Even before *The Graduate*, plastic doubts were not limited to Norman Mailer. A few observers of the American scene sensed a connection between the presence of synthetics and the new postwar mode of life. Around 1960, two writers who established their reputations on soundings of a hollowness at the core of suburban life almost casually referred to plastic as a carrier of meaning. For John Cheever, "the burden of modern life, even if it smelled of plastics—as it seemed to—bore down cruelly on the supports of God, and Family, and the Nation." Less insistent, his younger colleague John Updike made several references to

plastic in *Rabbit, Run*, a famous novel of postwar anomie. After an opening scene in which former high school basketball star Rabbit Angstrom has intimations of mortality while shooting baskets in the neighborhood, he runs up the hill to the duplex that traps him in a blighted marriage. Under the front step "a lost toy molders . . . a plastic clown." Later, whenever Rabbit enters the house, he is depressed by "the kid's toys here and there broken and stuck and jammed." His son's "broken toys on the floor derange his head," reminding him of his marriage. For all that, Updike also permits Rabbit to find comfort in plastic, in "that sweet tangy plastic new-car smell" that "cools his fear" as he leaves his wife for another woman, and after their reconciliation, as he watches his son at a playground, in nostalgia set off by "the forgotten smell of that narrow plastic ribbon you braid bracelets and whistle-chains out of" at summer camp. Updike clearly intended plastic to carry symbolic meaning, but remained as ambivalent about it as about the possibility of finding moments of integrity and transcendence in contemporary life.[20]

Any uncertainty about plastic vanished a few years later as the emerging youth culture identified it with everything its members despised in American life. Typical was a New Left manifesto of 1968 in which white college students rejected as "meaningless" the "white honkie culture that has been handed to us on a plastic platter." New York City activists complained of mental health services at Bellevue Hospital where "they take your brain out and fill the hole with plastic." As psychedelic drugs spread from initiates to casual trippers, a broadside warned that LSD was "truly a product of this culture's technology and the trip can be as plastic as the system" that produced it if not taken with spiritual intent.[21] The word was so common a term of derision that when journalist Leonard Wolf interviewed San Francisco hippies in 1967, he asked a leader of the community whether he considered his parents "up tight and plastic." Another tourist from the outside world, sociologist Lewis Yablonsky, devoted a book to exploring the hippies' rejection of the "plastic society" with its "massive hypocrisy and dishonesty." Disillusioned after a stint of participant observation, Yablonsky concluded that "much of the hippie philosophy and way of life is even less satisfying, more hypocritical, and more plastic than straight society."[22]

As intellectuals wrestled with the question of why so many of history's most pampered generation spurned their inheritance, the presence of plastic loomed large in their thoughts. One of the most popular explanations was offered by Yale law professor Charles Reich's book, *The Greening of America*. In his opinion, American life was too artificial, too regimented, too predictable—in a word, too plastic. While most work was "pointless and empty," the leisure it earned was frittered away in a "grossly commercial" culture. "Our life activities," he wrote, "have become plastic, vicarious, and false to our genuine needs, activities fabricated by others and forced upon us." In a process of "impoverishment by substitution," the "corporate state" had weaned Americans from natural pleasures and made them dependent on artificial things. Owing to the profit motive and the urge for control, "the genuine is replaced by the simulated." For Reich it was "all epitomized by Astro Turf," the product of an artificial culture "profoundly hos-

tile to life." But youthful protesters were pointing the way to "a culture that knows how and when to use technology, a culture that is not plastic or artificial but guides and uses technology in pursuit of values that are derived from human sources." Even their drab clothes, "browns, greens, blue jeans," demonstrated rejection of the "plastic, artificial look of the affluent society" and expressed an "affinity with nature." The book's final sentence predicted the "greening" of an America no longer condemned to be "encased" in "plastic."[23]

Similar ideas appeared in Theodore Roszak's *Where the Wasteland Ends*, an analysis of high tech culture focusing on "the expanding artificiality of our environment." Like Mailer, Roszak found special resonance in the figure of an astronaut "sealed up and surviving securely in a plastic womb that leaves nothing to chance or natural process." Ultimately, everyone would share the astronaut's situation as "all places become the same gleaming, antiseptic, electronic, man-made place, endlessly reproduced," and all people yielded to the addictive security of the "wholly controlled, wholly artificial environment." Inevitably, however, this brave new world would fall into decay if the human race avoided nuclear war, and "the scene [would] be indefinably sad and shoddy despite the veneer of orthodox optimism . . . rather like a world's fair in its final days, when things start to sag and disintegrate behind the futuristic facades, when the rubble begins to accumulate in the corners, the chromium to grow tarnished, the neon lights to burn out, all the switches and buttons to stop working." And then, in the final manifestation of decay, "everything will take on that vile tackiness which only plastic can assume, the look of things decaying that were never supposed to grow old, or stop gleaming, never to cease being gay and sleek and perfect."[24]

For Tom Wolfe, a more meticulous observer than either Roszak or Reich, much of America had already fallen to such a state—or had never risen out of it. As Wolfe portrayed the world in his "new journalism," plastic exuded an aura of sleaze. A long catalogue of "the Rat lands of America," with their "drive-ins, mobile-home parks, Dairy Queens, superettes," ended with such details as the "$8,000 bungalows with plastic accordion-folding partitions and the baby asleep . . . in a foldaway crib of plastic net." Such phenomena fascinated Wolfe. He opened a profile of Marshall McLuhan by describing a "trick snap-on necktie with hidden plastic cheaters" that the otherwise "distinguished looking" media theorist wore at their first meeting. Another profile featured Carol Doda, a topless dancer who "became the greatest resource of the San Francisco tourist industry" when she "blew up her breasts with emulsified silicone" and thereby became "the put-together girl." On another occasion he wrote, of a massive Beatles concert, "it might as well have been four imported vinyl dolls for all it was going to matter." Most of the time Wolfe's references to plastic remained embedded in observed reality, but sometimes he waxed as metaphorical as Mailer. In a piece on customized cars, Wolfe lamented that, with Detroit sponsoring custom auto shows, "the manufacturers may be well on the way to routinizing the charisma, as Max Weber used to say, which is to say, bringing the whole field into a nice, safe, vinyl-glamorous marketable ball of polyethylene." Unlike Roszak, Wolfe hardly considered plastic emblematic of everything wrong with American soci-

ety. But he did lend his power of expression to the notion that plastic was second-rate, unauthentic, vulgar, and somehow obscenely humorous. His offhand remarks may have done more than any earnest polemic to destroy plastic's image for young Americans—though hardly as much as *The Graduate*'s famous line.[25]

A glance at almost any fictional work of the 1960s or 1970s, whether popular or literary, reveals that plastic—as material and as concept—had become a pejorative used with confidence that readers would not object. Writers of detective novels and thrillers, exploring America's seamy underbelly, proved most casual at tossing off references to plastic. In 1962, Ross Macdonald's investigator Lew Archer described a living room "furnished with the kind of cheap plastic pieces that you're still paying installments on when they disintegrate." Twelve years later, Robert B. Parker's sleuth Spencer waxed apoplectic as he drove north from Boston into a ten-mile "plastic canyon" of "sub-sandwich shops, discount houses, gas stations, supermarkets, neocolonial furniture shops (vinyl siding and chintz curtains), . . . an automobile dealership attractively done in glass and corrugated plastic, an enormous steak house with life-sized plastic cows grazing out front." At about the same time, across the continent in a fading Montana, James Crumley's dissolute Milo Milodragovitch was subsisting on "plastic sandwiches" and becoming entangled with a client "from a simpler, better time" when "screen doors smelled like rain or dust instead of plastic." Apolitical and reactionary thrillers routinely invoked plastic. In one of Dick Francis's racetrack mysteries, a professor left the track early because "fifty plastic students were waiting for him to pat their egos." And in one of Simon Brett's theater-based mysteries, the characters were "little plastic people being manipulated" by a murderous director. By 1986, even one of Robert Ludlum's doomsday epics could describe negotiations over Hong Kong's future as marked by "tension beneath the civility, the verbal placebos, and the plastic smiles."[26]

Writers of serious fiction reinforced the idea there was something wrong with plastic. The trend was most evident among authors whose political ideology or cultural stance was at odds with the mainstream. In Robert Stone's *A Hall of Mirrors* an old man rips into greedy speculators who "have done plasticated the entire country over"—a more or less physical description—and then metaphorically describes a corrupt politico as a "knock-nose hooley" with "two hundred and six bones in his body and every one of them plastic." Even more angered by what he perceived as a dishonest antihuman culture was the African-American writer Ishmael Reed, whose jazzily inventive counterhistory *Mumbo Jumbo* in 1972 posited an age-old white man's control conspiracy organized by a secret Masonic Wallflower Order. There was "nothing real" at the Order's headquarters; it was "a gallimaufry of synthetic materials . . . polyurethane, Polystyrene, Lucite, Plexiglas, acrylate, Mylar, Teflon, phenolic, polycarbonate." If the Order had its way, "plastic" would "prevail over flesh and bones," and the joy of "all night . . . dancing and singing" would yield to a sterile round of "build, drill, progress." This sense of cold abstraction pervaded other literary uses of plastic. Stanley Elkin, for example, in 1976 referred to the effect of multiple sclerosis on

a character whose disease had "deadened others as well as himself," giving them "the dead, neutral texture of plastic." Another writer, Gilbert Sorrentino, parodied literary treatments of plastic. His *Mulligan Stew*, an intellectually trendy metafiction of 1979, boasted as a character a writer called Antony Lamont who composed a letter discussing his own novel with its "overriding symbol" of "plastic" chosen because it perfectly represented his own characters as a "sterile and lost group of people."[27]

Widespread use of "plastic" in fiction to imply cheapness, falsity, or violation of nature suggested that readers silently assented to such characterizations. Everyone understood a reference to a "plastic person" or a "plastic smile." No one, except for an irritated plastics executive, would have questioned its rightness. Derogatory references filled the mass media and everyday speech. Businesses that used traditional materials had a field day. Swissair, for example, bragged in a *New York Times* advertisement that its passengers enjoyed "gourmet meals too good to serve on plastic." Hobart boasted in *Good Housekeeping* that its KitchenAid mixer—"all metal, no plastic"—was so durable it was "often handed down from mother to daughter." The fifth-graders of Four Corners Elementary in Greenfield, Massachusetts, balked when the school cafeteria began using plastic forks and spoons and protested that "real people deserve real silverware." Even industrial designer Raymond Loewy, who had promoted use of plastic from the 1930s into the 1960s, somehow managed in 1979 to berate American civilization for becoming a "plastic world" of "cheap, sleazy junk." By then the plastic industry had suffered a series of blows so devastating that the word's semantic degradation seemed harmless by comparison. Ecological concerns increased so steadily after the first Earth Day of 1970 that insiders feared the crisis might "really end the industry."[28]

By definition the plastic industry was everything ecological activists wanted to expunge from American experience. Since the early twentieth century, promoters of industrial chemistry and synthetic materials had boasted of transcending age-old limits of traditional materials by extending scientific control over nature. Predictions of an expanding stream of inexpensive artificial goods had suggested material abundance as a basis for a utopian democracy. By the final third of the century, that transcendence threatened to drain natural resources and to pollute the society that supported it by generating a flow of irrecoverable, inassimilable matter—garbage, society's excrement. Industrial chemistry had ushered in a thermoplastic flux whose artificiality threatened to poison or submerge nature if it could not fully replace it.

The most eloquent ecological critic of the plastic industry was Barry Commoner, whose book, *The Closing Circle: Nature, Man, and Technology*, argued in 1971 that the human race had "broken out of the circle of life, converting its endless cycles into man-made, linear events." This one-way process of divergence from nature afforded evidence of a "nearly fatal illusion," the assumption "that through our machines we have at last escaped from dependence on the natural environment." Since that statement embodied the fundamental tenet of plastic utopianism, it was not surprising he had nothing good to say about synthetic

materials. Commoner argued that of all species, human beings were "uniquely capable of producing materials not found in nature," resulting in the world's first known "intrusion into an ecosystem of a substance wholly foreign to it." Nature had no mechanisms for breaking down the "literally indestructible" plastics and integrating them into its eternal cycles. It was "sobering," he wrote, "to contemplate the fate of the billions of pounds of plastic already produced," some of it incinerated and thus polluting the air, some of it dumped in the ocean and harming marine life, the rest of it straining landfills or strewn across the landscape. Beyond that were unknown possibilities of carcinogenic plasticizers and other chemicals released during plastic's use. Dismissing the idea of a technological fix, Commoner attributed the problems not to "some minor inadequacies in the new technologies" but to "their very success in accomplishing their designed aims." Discarded plastics "clutter the landscape," he concluded, "*because* they are unnatural, synthetic substances designed to resist degradation—precisely the properties that are the basis of their technological value." Survival of the human race was threatened by ignorant exploitation of an unprecedented ability "to tear the ecological fabric that has, for millions of years, sustained the planet's life."[29]

Even before "whole earth" became an idea to fight for, industry watchdogs had occasionally warned that disposing of disposables might prove costly. As early as 1966, Joel Frados, editor of *Modern Plastics*, advised readers to think constructively about the issue before "well meaning but misinformed authorities step in with homemade remedies and regulations."[30] Soon after taking over as editor in 1968, Sidney Gross protested that the "problem of garbage" flowed not from packaging or plastics but from "our civilization, our exploding population, our life-style, our technology." It was unfortunate that plastic's 2 percent by weight of the nation's solid waste comprised "the most visible garbage, and the most lasting." All too often the public condemned plastic as a "villain" to be "exorcised from the economy."[31] It certainly seemed that way in 1970 when a member of the liberal city council of Madison, Wisconsin, proposed a ban on nonreturnable food and beverage containers and a one dollar deposit on every returnable container. Initially considered a joke, the ordinance was taken seriously after the proposed deposit was reduced to fifteen cents. Within a year, fifteen state legislatures were considering bills to ban or limit plastic bottles or containers.[32] Especially threatening was a tax of two cents passed in New York City in the summer of 1971 on every plastic bottle or container. After six months of opposition to the ordinance, the SPI succeeded in having it declared discriminatory and thus unconstitutional. The legal battle was the first in a long series fought by the society in defense of disposable plastics, led by its attorney, Jerome H. Heckman.[33]

As the industry heeded expressions of environmental dismay, sanitation engineers and plastics executives debated landfills versus incinerators for disposing of disposables. Because plastic remained inert in landfills and did not release toxic fumes through decomposition, it seemed an ideal packaging material, superior to traditional paper products. But as the prospect of overflowing landfills loomed, attention turned to incineration, and with it a fear that chemicals released by

burning plastic would pollute the air, corrode incinerators, and leach into ground water. By 1970, people discussed options such as recycling disposables and developing plastic resins that would decompose in sunlight or in the presence of soil bacteria. Neither idea gained adherents except among environmentalists and newspaper editors. A disintegrating plastic would violate everything the industry had worked toward in creating dependable, durable products. Recycling seemed impractical because it required sorting out dozens of different resin formulations from the general flow of garbage.[34] Not until the late 1980s did the plastic industry take recycling seriously. By then, the inhabitants of the United States generated about ten million tons of plastic waste each year. This waste comprised approximately 7 percent of the annual flow of garbage *by weight*, the measure the SPI typically used to minimize its impact, but it comprised a more impressive 16 to 25 percent *by volume*. With landfills dwindling, the industry adopted a system of resin codes for marking disposable containers for easier sorting. Material suppliers set up pilot projects for blending recycled materials with virgin resins and encouraged entrepreneurs to experiment with molding scrap into boards, flower pots, and other low-tech objects. By then it had long been true, as an engineering journal observed in 1979, that "plastics recycling" had "shifted from its emotional history . . . to an era of serious research and development."[35]

Long before that "emotional history" had run its course, the industry experienced a series of nonstop one-two punches during the early 1970s. The initial uproar over solid waste came to a head in 1971 with dozens of regulatory bills introduced across the country. At that time the issue that most provoked opposition was not the overriding problem of garbage, but rather the aesthetic problem of litter. With landfills nowhere near bursting, it was easier to arouse people about bleach bottles washed up on beaches and styrofoam cups tossed along the road. While paper litter quickly disintegrated, the plastic stuff remained as a visual reminder of an inflationary culture.

Not all litter was harmless. In March 1972, Edward J. Carpenter of Woods Hole Oceanographic Institute opened a new issue by announcing he had found tiny bits of plastic in Long Island Sound at a density of one to twenty samples per cubic yard of water. Not only were toxic plasticizers released into the marine food chain, he suggested, but bits of plastic provided surfaces for bacterial growth and blocked digestive tracts of smaller fish. Other investigators reported the Sargasso Sea clogged with plastic—minute spheres of styrofoam, worn discs of polyethylene, bits of bottles, torn sheets of film, strapping bands—most of it dumped from ships, battered by waves, and becalmed in an area formerly romanticized as a ship's graveyard.[36] Carpenter proved willing to compromise, to work behind the scenes without embarrassing the industry. In April 1972, he informed Ralph L. Harding Jr., the SPI's new executive vice-president, that fresh spheres of polystyrene resin in Long Island Sound indicated dumping by a plastic processor. A letter from Harding to polystyrene producers flushed out the anonymous culprit, ended the spills, and Carpenter seemed "willing to drop the matter," though he and the U.S. Coast Guard continued to monitor the sound.[37] This episode of wary cooperation hardly ended the problem of ocean pollution. As the tide of

trash swelled at sea, with seven million tons dumped in 1980, most of it from ships, thousands of fish and birds died from ingesting particles of plastic, thousands of sea turtles and whales died from swallowing plastic bags or sheets of film, and miles of plastic driftnets discarded by fishing vessels entangled seals, sea lions, and birds. At the end of 1987, the United States finally signed a United Nations treaty prohibiting ocean dumping from ships, but the problem was far from solved.[38]

By 1972, many Americans were sensitized to environmental issues, enough that they might support taxes on disposable containers, but not so much that they would give up the convenience of plastic. The industry proved so successful in defending itself against legislative attacks that some executives assumed the worst was over. Even Harding, whose job it was to coordinate the defense, admitted that they had entered a "lull" except for occasional "anti-plastics" attacks in the media. He cautioned against the attitude "that our troubles are behind us" and referred to the relative calm as "the eye of the storm."[39] Little did he suspect the size of that storm. The environmental debate over plastic had focused on issues that did not concern anyone's immediate welfare, but that soon changed. By the end of the year, the Federal Trade Commission (FTC) was investigating reports that polyurethane foam and other synthetics were more flammable than industry testing standards indicated. Several airplane accidents in which dozens of passengers were asphyxiated revealed that many plastics released toxic fumes when burned. The threat of toxic fumes from burning plastics extended beyond aviation into the everyday lives of people who encountered polyurethane foam in furniture, bedding, and auto interiors.[40]

Despite an eleventh-hour meeting of representatives from the FTC, the SPI, Underwriters Laboratories, the American Society for Testing Materials (ASTM), and various safety and insurance groups, the FTC in May 1973 filed a class action suit against twenty-six material suppliers, the SPI, and the ASTM for making false claims about nonflammable or self-extinguishing qualities of polyurethane and polystyrene foams. Ralph Harding of the SPI and Sidney Gross of *Modern Plastics* cried foul, arguing there was no need for persecution when the industry was already responding to inadequacies in outdated ASTM tests and standards.[41] Within the next two years a study at the University of Utah's Flammability Research Center confirmed that laboratory rats who could survive exposure to concentrated wood smoke would succumb to fumes from burning polyurethane, and the National Academy of Sciences convened a committee headed by pioneer polymer chemist Herman F. Mark to investigate improvements to aviation synthetics.[42] But the damage was done, confirming a popular image of the modern airliner as a "potential gas chamber" and threatening an annual output of 500,000 tons. A comment from an insurance executive suggested that plastic's utopian slant had gotten it into trouble. "Hell," he declared, "the wood industry doesn't claim its products don't burn." The revelation of hidden danger at the heart of a high tech material dedicated to unearthly perfection proved especially damaging to its public image.[43]

Before the industry had time to recover, it took another blow that threatened to be even more serious. While most people could expect to avoid being in a fire, no one could avoid daily exposure to a plastic as common as polyvinyl chloride (PVC). By the middle of 1973, with the industry reeling from accusations of fraud about flammability, it was common knowledge that the newly organized Occupational Safety and Health Administration (OSHA) was investigating reports of workers in vinyl processing plants suffering at an excessive rate from angiosarcoma, a rare liver cancer. Sixteen American vinyl workers had died of the disease since 1961. Another ten had died in Europe, where the correlation first came under investigation. Tests with laboratory animals confirmed early in 1974 that vinyl chloride monomer, the gas from which polyvinyl chloride was polymerized, was carcinogenic. By all accounts, many chemical companies producing vinyl resin were lax about meeting even minimal exposure standards of fifty parts of gas per million parts of air. It was not unusual for workers to descend unprotected into polymerization vats to scrub them out. Six thousand American workers were routinely exposed to vinyl chloride gas. The AFL-CIO's health director denounced vinyl producers for a "barbaric attitude that death and disease are part of the sacrifice that must be made for food, clothing and shelter." In October 1974, in the first major regulatory decision of its existence, OSHA mandated a new exposure standard of one part per million averaged over an eight-hour shift. Although resin suppliers, mostly the major chemical companies, claimed OSHA was destroying a $1.5 billion industry, they managed to comply. Sidney Gross later privately accused the PVC industry of being "slovenly" in its processing methods and noted that the monomer saved by OSHA's standards more than paid for reengineering a stricter process.[44]

After OSHA's revelations, a fear of vinyl extended beyond the men and women engaged in making it, and with good reason. People living near processing plants worried about the cancer risk from discharges of gas over the years. Some experts speculated about exposure to vinyl monomer through the burning of discarded vinyl at garbage dumps or the baking of auto upholstery in the sun. The Food and Drug Administration became concerned about vinyl monomer migrating from food containers. With even NASA preconditioning its high tech synthetics in a vacuum to force "off-gassing" of chemicals that otherwise might pollute air breathed by astronauts, ordinary citizens could be forgiven a suspicion that litter was not plastic's most serious environmental impact. Fear of cancer, the era's most inexplicable medical killer, added an irrational element to a negative image transcending the old disdain for the cheap and shoddy. Just as plastic had stood in for radioactive fallout at the time of the dry cleaning bag crisis, it now became a highly visible stand-in for often nebulous products and by-products of the chemical industry, whose reputation was so low, partially owing to use of napalm and defoliants in Vietnam, that Du Pont in 1972 abandoned its "Better Things for Better Living" slogan.[45]

As if flammability and toxicity were not enough to engage the industry's defenders in 1973, they also confronted the Arab oil embargo and the resulting energy crisis. Initial worries revolved around supplies and prices. Some resin

suppliers limited deliveries to long-standing customers. Others increased exports to Europe, where they could charge five times as much as domestic price controls allowed. "It has taken five years off my life," complained a resin buyer for the Mattel toy company. As the supply of petroleum feedstocks became more uncertain, alternate sources of raw materials became an issue. One expert inaccurately predicted that coal would replace petroleum as the main source of plastic before the year 2000. In the meantime, the industry counseled petroleum conservation. As Sidney Gross put it, while thanking Congress for retaining the controversial fifty-five-mile per hour speed limit, "Every gallon saved is resin in the hopper."[46] Designers became adept at "resin-stretching" by molding products with thinner walls or by specifying new structural foams that "put air bubbles where material used to be." Such innovations saved oil twice—by using less resin and by decreasing weight-based transportation costs.[47] Only after confronting immediate problems of shortages did some people in the industry realize they were open to attack for wasting petroleum to make throwaway products. What started out as in-house economics became another nail in the plastic coffin.

A typical attack on the industry for diverting scarce petroleum appeared in June 1979 in a *New York Times* op-ed piece by Robert C. Lohnes, who described an "ocean" of oil "gulped by plants manufacturing millions of disposable plastic knives, forks, plates and scores of other products." The plastic industry sucked up "millions of barrels of oil" each month, much of it for "disposable products . . . littering our streets and parks." Maintaining that a return to paper and wood as primary materials would contribute to solving the energy crisis, Lohnes said he would "trade a plastic cup for a gallon of gasoline any day." Sidney Gross later recalled the energy crisis as "a very happy issue for us" because its major antiplastic argument was "easily pricked." Although the industry seemed to be wasting energy by using oil as the raw material for its products, it was actually saving energy. Because plastic was a less dense material than metal or glass or even wood, it consumed less energy in processing, manufacture, and shipping. The amount of petroleum consumed both as material and as energy in the making and transporting of a plastic bottle, for example, was less than the petroleum consumed as energy in the making and transporting of a glass bottle. Another convincing argument for the energy-conserving aspect of synthetics stemmed from the auto industry's effort to use ever more plastic to make cars lighter and thus increase gas mileage. As a Texaco advertisement boasted, "We're putting more petroleum in the body of your car so you can put less in your tank."[48]

Support for the industry's defense came from a seemingly unlikely source, the ecologically minded Worldwatch Institute. In 1980, Christopher Flavin completed a fifty-five-page report, *The Future of Synthetic Materials*, advocating continued use of plastics because "many natural materials actually consume more oil and natural gas than synthetics do." In the United States, synthetics annually consumed nine hundred million barrels of oil, only about 3 percent of the total consumption of petroleum and natural gas. Two-thirds of that small amount went for feedstocks, one-third for energy used in processing. Making plastics was

"one of the most valuable uses" of oil and natural gas, a process more beneficial than burning it up. Even so, Flavin came down hard on ecological deficiencies, especially toxic manufacturing wastes and the fact that one-quarter of production almost instantly became garbage. He also observed that the postwar "synthetic materials revolution" was "intimately connected with the worldwide economic expansion" of the same period, both being "fueled by abundant and cheap supplies of oil and natural gas." Now that those supplies were curtailed, with every prospect (he wrongly predicted) of oil reaching one hundred dollars a barrel by 1990, Flavin believed that intelligent exploitation of synthetics offered a way of maintaining the material gains of that temporary expansion as the world adjusted to the reality of a steady-state or diminishing economy. "In an oil-short world," his report concluded, "synthetics are likely to be much more essential than they are today."[49]

When the *New York Times* introduced a summary of Worldwatch's favorable findings by observing that use of plastic was "often discouraged and even disparaged . . . as symbolic of a throwaway society," the tone clearly implied that such critics did not know what they were talking about. By 1980, the plastic industry was close to full cultural rehabilitation, with details regarding solid waste and toxicity left to supposedly responsible technical experts. But in 1973, when the energy crisis first emerged, the industry confronted a state of siege. A beleaguered Sidney Gross complained that the industry was "facing more major crises than it has ever confronted before—all at once." Among them were "supplies, flammability, toxicity, environment, and OSHA," all demanding "to be dealt with almost simultaneously." A year earlier, Ralph Harding had addressed a meeting of plastics distributors in terms that revealed a sense of isolation from most of society. He expressed genuine concern for environmental issues, citing the Club of Rome's study of overpopulation, *Limits to Growth*, and hinting that solid waste would remain a problem long after air and water pollution were resolved. But he focused primarily on the industry's image. As if speaking to people who might not believe him, Harding insisted that "there really are a lot of people in this country who think plastics are bad." According to the SPI's opinion surveys, the general public was "not very excited about ecological matters." But among "a large number of the educated, the active, the community leaders," there was much "opposition to plastics." Many considered plastic "somehow bad—ersatz, phony, substitute." Harding took pains pointing out to possibly skeptical distributors that the SPI had trouble "mobilizing" the industry precisely because "our people, particularly those with technical training, would look at some of the statements that people were making about plastics and they couldn't take them seriously." Trying to put the best light on a bad situation, he joked that the phrase "plastic society" differed little from earlier phrases like "glass jaw, paper tiger, wooden nickel, rubber check, tin ear," indicating that "people traditionally pick on a material in this way." Sadly there was still "massive misunderstanding or lack of understanding about plastics." The public had to be educated. People had to be informed of plastic's contributions to "better living."[50]

An equally exasperated sense of betrayal marked Sidney Gross's editorials in *Modern Plastics* during the late 1960s and early 1970s. Writing soon after *The Graduate*'s release, he complained that plastic's reputation "remained about as low as it can get" despite a phenomenal growth rate. "Somebody must like the stuff" was his grumpy conclusion. "If they hate plastics so much," the magazine groused in 1970, "how come they're buying more and more of it?"[51] Eventually Gross decided that a poor image had little practical effect because consumers could choose only from among goods presented in the marketplace. If manufacturers used plastic—whether for versatility of design, durability, lower cost, or greater profit—then consumers had no choice but to go along. Even those who thought they despised plastic would buy it and use it, often without even recognizing it. "If we were as evil as our adversaries claim," Gross once wrote, then "we wouldn't be where we are today."[52] He would have appreciated a science fiction tale, *Mutant 59: The Plastic Eaters*, published in 1972 at the height of plastic's period of ill repute. A clever disaster novel, it described a strain of bacteria mutating after exposure to a new biodegradable plastic and thereby gaining an ability to feed on *any* plastic. As solid plastic turned to slime everywhere, toys ran amok, clothes melted, heart valves malfunctioned, subway trains crashed, and an airliner dissolved in midair. "Good God, just think of it," a character declared. "Take out plastic from a modern city and what do you get—complete breakdown." Like it or not, as he put it, "we're totally dependent on it."[53] Eventually the technical experts devised methods for isolating and neutralizing the mutant bacteria, for reasserting the control that plastic had always promised. But with the melting into slime of most plastic objects, a kind of ultimate reputation for shoddiness was established. And with an irony Mailer would have appreciated, the novel ended with a contaminated space probe landing on Mars, ready to dissolve any future expansion of plastic beyond the bounds of spaceship earth.

In the real world, plastic's expansion continued, as did the inflationary culture of which it was substance and image. The throwaway society kept on expanding as Americans learned to live with more and more of less and less. They glimpsed the outlines of a new relationship to things, or a more tenuous conception of things, as the physical yielded to the digital, the real to the virtual, the material to the immaterial, the plastic presence to the process of plasticity. As that transformation began, or as intellectuals posited such a transformation, plastic's meaning began to shift almost beyond any correlation to material things. Once again, after several decades, plastic expressed a sense of limitless shape-shifting.

Jeffrey L. Meikle *is Professor of American Studies and Art History and the director of the American Studies Program at the University of Texas at Austin. His recent book,* American Plastic: A Cultural History *(Rutgers University Press, 1995), from which this article is adapted, was awarded the Dexter Prize for 1996 by the Society for the History of Technology.*

Notes

1. "New Products: Prometheus Unbound," *Time*, 19 September 1960, 94. See also David M. Potter, *People of Plenty: Economic Abundance and the American Character* (Chicago: University of Chicago Press, 1954).
2. *The Graduate*, dir. Mike Nichols (Embassy Pictures, 1967). A popular and critical success, the film enjoyed an initial gross that placed it behind only *Gone with the Wind* and *The Sound of Music*. Although Calder Willingham shared screenwriting credit with Buck Henry, the latter wrote the final script, including the plastics scene, which did not appear in the original novel by Charles Webb. Interviewed in 1992, Henry recalled that at Dartmouth College in the 1950s he had heard *plastic* used, presumably as an adjective, by philosophy professor Eugen Rosenstock-Huessy to refer (in the interviewer's paraphrase) to "a civilization that abandons its values." See Jay Boyar, "When 'Plastics' Became a Bad Word," *Washington Post*, 30 August 1992, G4.
3. Roland Barthes, "Plastic," in *Mythologies*, trans. Annette Lavers (New York: Hill and Wang, 1972), 97–99. This article was originally written between 1954 and 1956 and reprinted as "Le Plastique" in *Mythologies* (Paris: Editions du Seuil, 1957), 192–94.
4. "How Your World Will Change," *New York Times*, 26 May 1968, sec. 12, p. 3.
5. Stuart Siegel, "A Note from the Publisher," *Modern Plastics* 56 (January 1979): 3.
6. Ruth Carson, "Plastic Age," *Collier's*, 19 July 1947, 49–50. On plastic utopianism and the Du Pont exhibitions, see Jeffrey L. Meikle, *American Plastic: A Cultural History* (New Brunswick, N.J.: Rutgers University Press, 1995), 68–74, 134–36, 140, 142–47.
7. Norman Mailer, interviewed by Arlene Francis on New York radio station WOR, quoted in Sidney Gross, "Nuts" (editorial), *Modern Plastics* 48 (March 1971): 51; Paul H. Weaver, "On the Horns of the Vinyl Chloride Dilemma," *Fortune*, October 1974, 150.
8. Norman Mailer, "The Big Bite," *Esquire*, April and May 1963; reprinted in Norman Mailer, *The Presidential Papers* (New York: Berkley Medallion, 1970), 159, 178–79.
9. Norman Mailer, *Of a Fire on the Moon* (Boston: Little, Brown, 1970), 130, 186.
10. Ibid., 141–42, 316.
11. Paul Sargent Clark, "The Coming (Any Minute) Revolution for Plastics," *Industrial Design*, October 1967, 65; Walter McQuade, "Encasement Lies in Wait for All of Us," *Architectural Forum*, November 1967, 92; "S.F. Baby Killed By Plastic Bag," *San Francisco News*, 20 May 1959, Clipping Scrapbook, Society of the Plastics Industry Files, Washington, D.C. (hereafter cited as SPI Files).
12. "This Bag Spells Business," *Du Pont Magazine*, February-March 1956, 24.
13. Ibid., 25. Sales figures are from an Associated Press story, "Ad Campaign to Warn of Plastic Bag Danger," appearing, among other places, in the *Wilkes-Barre Times-Leader-News*, 18 June 1959, Clipping Scrapbook, SPI Files.
14. Paul B. Jarrett, quoted by the American Medical Association, quoted in a brief history of the "Polyethylene Bag Problem," SPI Board Minutes, 23-24 July 1959, p. 28, reel 3, microfilm, Society of the Plastics Industry Archive, Hagley Museum and Library, Wilmington, Delaware (hereafter cited as SPI Archive).
15. Mildred Murphy, "Plastic Industry to Warn on Bags," *New York Times*, 18 June 1959, 33; "79 Infant[s] Have Died in Plastic Bags," *New Kensington (Penn.) Dispatch*, 24 July 1959, Clipping Scrapbook, SPI Files.

16. Du Pont spokesman, paraphrased by Morris Kaplan, "Industry Warns on Plastic Bags," *New York Times*, 4 June 1959, 33; Hiram McCann, "Hazards in Film Misuse Must Be Taught Parents," *Modern Plastics* 36 (June 1959): 262; "This Bag Spells Business," 25; and "Dry Cleaning: Big New Market for Film," *Modern Plastics* 35 (April 1958): 106–7.
17. "Warning: 28 Died Like This," *Toronto Telegram*, 25 May 1959, 41, Dry Cleaning Bag Scrapbook, no. 3, SPI Archive; "S.F. Baby Killed By Plastic Bag"; "Plastic Sheeting Claims 2 Lives," *New York Journal*, 12 June 1959, Clipping Scrapbook, SPI Files; William T. Cruse, quoted in William M. Freeman, "Producers Shape Plastic-Bag Code," *New York Times*, 29 July 1959, 60; "Of Plastic Bags . . . And Our Future," *Redwood City Tribune*, 6 July 1959, Dry Cleaning Bag Scrapbook, no. 3, SPI Archive; "How Many Must Die?," *San Francisco News*, 20 May 1959, Clipping Scrapbook, SPI Files. Only a few months earlier, in March 1959, the public reacted with anxiety, but considerably less hysteria, to a *Consumer Reports* article on strontium-90 in milk. See Norman Isaac Silber, *Test and Protest: The Influence of Consumers Union* (New York: Holmes and Meier, 1983), 108–12, and Allan M. Winkler, *Life Under a Cloud: American Anxiety About the Atom* (New York: Oxford University Press, 1993), 102–3.
18. "Thin Bag of Death," *Life*, 8 June 1959, 117. For other photographs, see "Wave of Publicity Warns Parents of Plastic Bag Danger," *Santa Ana (Calif.) Register*, 7 June 1959, Dry Cleaning Bag Scrapbook, no. 3, SPI Archive, and "Warning: 28 Died Like This."
19. Jerome H. Heckman, general counsel for the SPI, quoted in Robert Leaversuch, "The SPI at 50: Looking Into an Exciting, Uncertain Future," *Modern Plastics* 64 (September 1987): 50–51.
20. John Cheever, "The Brigadier and the Golf Widow," in *The Stories of John Cheever* (1978; reprint, New York: Ballantine, 1980), 599; John Updike, *Rabbit, Run* (1960; reprint, New York: Fawcett Crest, 1969), 10, 16, 83, 87, 188.
21. Detroit Artists Workshop, "White Panther Manifesto" (1968); Yippie broadside, New York City (ca. 1967); and "Acid-Armed Consciousness," broadside, New York City (ca. 1968), all reprinted in *Bamn: Outlaw Manifestos and Ephemera 1965–70*, ed. Peter Stansill and David Zane Mairowitz (Baltimore: Penguin, 1971), 176–77, 107, 161.
22. Leonard Wolf, with Deborah Wolf, *Voices from the Love Generation* (Boston: Little, Brown, 1968), 216; Lewis Yablonsky, *The Hippie Trip* (1968; reprint, Baltimore: Penguin, 1973), 97, 272. The word *straight* in 1968 commonly referred to a member of mainstream society, a nonhippie.
23. Charles A. Reich, *The Greening of America* (1970; reprint, New York: Bantam, 1971), 6–7, 171–72, 193, 203, 408–9, 252, 430.
24. Theodore Roszak, *Where the Wasteland Ends: Politics and Transcendence in Postindustrial Society* (Garden City, N.Y.: Doubleday, 1972), 14, 18–19, 63–64. Roszak admitted being influenced in this passage by Jean-Luc Godard's film *Alphaville* (1965); his vision of a crumbling plastic utopia also seems eerily prophetic of Terry Gilliam's film *Brazil* (1985) and of the disintegration of the Soviet Union (1991).
25. Tom Wolfe, *The Electric Kool-Aid Acid Test* (1968; reprint, New York: Bantam, 1969), 261, "What If He Is Right," in *The Pump House Gang* (1968; reprint, New York: Bantam, 1969), 107, "Introduction" and "The Put-Together Girl," in *The Pump House Gang*, 1, 74, *The Electric Kool-Aid Acid Test*, 182, and *The Kandy-Kolored Tangerine-Flake Streamline Baby* (1965; reprint, New York: Pocket Books, 1970), 87.

26. Ross Macdonald, *The Zebra-Striped Hearse* (1962; reprint, New York: Bantam, 1984), 38; Robert B. Parker, *God Save the Child* (Boston: Houghton Mifflin, 1974), 8; James Crumley, *The Wrong Case* (1975; reprint, New York: Vintage Contemporaries, 1986), 137, 15; Dick Francis, *Rat Race* (1971; reprint, New York: Pocket Books, 1978), 29; Simon Brett, *An Amateur Corpse* (1978; reprint, New York: Berkley, 1980), 152; Robert Ludlum, *The Bourne Supremacy* (1986; reprint, New York: Bantam, 1987), 307.
27. Robert Stone, *A Hall of Mirrors* (1967; reprint, Boston: Houghton Mifflin, 1981), 352–53; Ishmael Reed, *Mumbo Jumbo* (1972; reprint, New York: Avon, 1978), 70–71; Stanley Elkin, *The Franchiser* (1976; reprint, Boston: Nonpareil Books, 1980), 227; Gilbert Sorrentino, *Mulligan Stew* (New York: Grove Press, 1979), 22.
28. Swissair Advertisement, quoted in "Answering the Critics," *Modern Plastics* 57 (May 1980): 34; KitchenAid Advertisement, *Good Housekeeping*, ca. December 1986; "Elementary Students Fed Up with New Plastic Silverware," Associated Press story in *The Daily Texan*, 20 January 1988, 3; Raymond Loewy, *Industrial Design* (New York: Overlook Press, 1979), 36; Sidney Gross, interview by author, 9 December 1986.
29. Barry Commoner, *The Closing Circle: Nature, Man, and Technology* (New York: Alfred A. Knopf, 1971), 12, 15, 127, 162–64, 185, 12.
30. Joel Frados, "There's Something in the Air," *Modern Plastics* 44 (October 1966): 89.
31. Sidney Gross, "Garbage (2)," *Modern Plastics* 47 (January 1970): 63, "Garbage," *Modern Plastics* 46 (April 1969): 81, and "Garbage (4)," *Modern Plastics* 48 (August 1971): 37.
32. "Nonreturnables Face Legislative Ban in Madison, Wisconsin," *Plastics and the Environment*, no. 1 (3 April 1970): 2–4, SPI Archives. See also Julian Kestler, "Localities May Tax Plastics Packaging," *Modern Plastics* 48 (May 1971): 14, 16.
33. Ralph L. Harding Jr., SPI Executive Vice President, to Executive Committee of SPI Environment Policy Committee, 10 June 1971, photocopy, Executive VP–Chronological or Reading File, 1971–77, SPI Archive (hereafter cited as VP Reading File); "Plastics Return the Ecologists' Fire," *Business Week*, 10 July 1971, 25; Julian Kestler, "New York's Plastic Container Tax Poses Grave Threat to Plastics Packaging," *Modern Plastics* 48 (August 1971): 10, and "What Are the Implications of the Overturning of New York City's Tax Law?," *Modern Plastics* 48 (December 1971): 18.
34. For typical discussions, see A. Stuart Wood, "Plastics' Challenge in Packaging: Disposability," *Modern Plastics* 47 (March 1970): 50–54; "A Plastic for Ecologists," *Time*, 11 May 1970, 86; "Plastics—Mostly PVC—Under Attack in Press," *Plastics and the Environment*, no. 3 (29 June 1970): 1–3, SPI Archive; "SPI Position Paper Outlines Industry's Stand on Coping with the Garbage Crisis," *Modern Plastics* 47 (October 1970): 184; and F. Rodriguez, "Prospects for Biodegradable Plastics," *Modern Plastics* 48 (September 1971): 92, 94.
35. Robert H. Wehrenberg II, "Plastics Recycling: Is It Now Commercially Feasible?," *Materials Engineering* 89 (March 1979): 34. For the lower estimate and a discussion of the difficulty of measuring volumes of garbage, see William Rathje and Cullen Murphy, *Rubbish!: The Archaeology of Garbage* (New York: HarperCollins, 1992), 99–102. See also Robert D. Leaversuch, "Industry Begins to Face Up to the Crisis of Recycling," *Modern Plastics* 64 (March 1987): 44–47; Cass Peterson, "Recycling: Making Cents of Trash," *Washington Post* Service, in *Austin American-Statesman*, 14 June 1987, D13; Guy Darst, "Plastic Bottles to Carry Code for Recycling," Associated Press article in *Austin American-Statesman*, 9 April 1988, B11; Myra Klockenbrink, "Plastics Industry, Under Pressure, Begins to Invest in Recycling," *New York Times*, 30 August 1988, 19; "Recycling: Don't Trash That Foam," *Time*, 9 January 1989, 48;

Barbara Rudolph, "Second Life for Styrofoam," *Time*, 22 May 1989, 84; SPI Council for Solid Waste Solutions, "The Urgent Need to Recycle" (advertising section), *Time*, 17 July 1989, 17–28; and House Committee on Small Business, Subcommittee on Environment and Employment, *Plastics Recycling: Problems and Possibilities*, 102d Cong., 2d Sess., 1992, serial 102-63.

36. Boyce Rensberger, "Plastic Is Found in Sargasso Sea," *New York Times*, 19 March 1972, 68; John B. Colton Jr., Frederick D. Knapp, and Bruce R. Burns, "Plastic Particles in Surface Waters of the Northwestern Atlantic," *Science*, 9 August 1974, 491–97.
37. Edward J. Carpenter to Ralph L. Harding, 10 April 1973, VP Reading File. See also a memorandum from Harding to U.S. polystyrene producers, "Polystyrene Contamination in Long Island Sound," 2 June 1972, VP Reading File.
38. Christine Duerr, "Plastic Is Forever: Our Nondegradable Treasures," *Oceans*, November 1980, 59–60; Robert D. Leaversuch, "Ocean Litter Becomes Public, Legislative Issues," *Modern Plastics* 63 (October 1986): 10–11; James Pinkerton, "International Ocean Pollution Treaty Approved," *Austin American-Statesman*, 1 January 1988, A17.
39. Ralph L. Harding, "PAC Strategy Ahead," memorandum to Steering Committee of SPI Public Affairs Committee, 16 August 1972, VP Reading File.
40. For background on flammability, see "Appliances—New Front for Attack on Plastics," *Modern Plastics* 36 (April 1959): 246; "What About Flame Resistance in Plastics?," *Modern Plastics* 37 (September 1959): 81–84, 176, 178; Joel Frados, "The Flammability Gap," *Modern Plastics* 45 (May 1968): 77; and Stuart Wood, "Facing the Problems of Fire," *Modern Plastics* 45 (June 1968): 82–86.
41. Richard O. Simpson, Department of Commerce, to Ralph L. Harding Jr., n.d., received 1 December 1972, VP Reading File; Ralph L. Harding to Richard O. Simpson, 18 December 1972, VP Reading File; Cleveland Lane, B. F. Goodrich Chemical Company, to SPI Ad Hoc Public Affairs Committee on Flammability, memorandum, 21 December 1972, VP Reading File. See also "F.T.C. Accuses Plastic Industry of Deception on Fire Hazards," *New York Times*, 31 May 1973, 1; and Sidney Gross, "Why Now, FTC?," *Modern Plastics* 50 (July 1973): 37.
42. J. H. Petajan et al., "Extreme Toxicity from Combustion Products of a Fire-Retarded Polyurethane Foam," *Science*, 28 February 1975, 742–44. Herman F. Mark discussed his work on flammability during a presentation at the University of Texas at Austin on 19 June 1989.
43. U.S. Representative Richard L. Ottinger (New York), quoted in Frados, "The Flammability Gap," 77; Martin M. Brown, American International Group Companies, quoted in C. Otis Port, "Fire!," *Modern Plastics* 50 (August 1973): 37, 38.
44. Sheldon Samuels, quoted in Janet H. Weinberg, "Toxic Surprises from the Plastics Industry," *Science News*, 7 September 1974, 155; Sidney Gross, interview by author, 9 December 1986. See also Roland R. MacBride, "OSHA and Materials Toxicity: The Issue Grows, and the Impact Begins," *Modern Plastics* 50 (August 1973): 16; Paul H. Weaver, "On the Horns of the Vinyl Chloride Dilemma," *Fortune*, October 1974, 150–53, 200, 202–4; "Of Mice and Men: Alarm Over Plastics," *Time*, 14 October 1974, 64.
45. On FDA and migration of vinyl chloride, see Roland R. MacBride, "A Closer FDA Eye on Extraction," *Modern Plastics* 51 (June 1974): 22; Sidney Gross, "VCM—What Now," *Modern Plastics* 51 (November 1974): 49; and papers on *Safety and Health with Plastics* (n.p.: Society of Plastics Engineers, 1977). The phasing out of Du Pont's slogan is mentioned by Graham D. Taylor and Patricia E. Sudnik in *Du Pont and the*

International Chemical Industry (Boston: Twayne, 1984), xx. With the exception of the final phrase—"Through Chemistry"—the slogan was later reinstated.

46. Quoted by Stephen J. Sansweet in "Plastics Firms Face Materials Shortages Believed Likely to Last at Least 2 Years," *Wall Street Journal*, 11 September 1973, 38; Gordon M. Kline, paraphrased in Roland R. MacBride, "More Feedstocks?," *Modern Plastics* 51 (June 1974): 20; Sidney Gross, ".500 for the Hill," *Modern Plastics* 51 (July 1974): 39. For other views of the immediate crisis, see Julian Kestler, "Plastics and the Energy Crisis: Big Changes Ahead in Price and Availability," *Modern Plastics* 49 (January 1972): 14, 16; and "Plastics Producers Sort Out the Oil Shortage," *Business Week*, 19 January 1974, 84, 86.
47. Mike Kenward, "Better Than Burning It," *Design*, no. 318, June 1975, 34. See also Sidney Gross, "Challenges of the Eighties," *Modern Plastics* 57 (January 1980): 55, and "Critical Buzzwords," *Modern Plastics* 57 (October 1980): 41.
48. Robert C. Lohnes, "Back to Wood, Back to Paper," *New York Times*, 6 June 1979, 27; Sidney Gross, interview by author, 9 December 1986; advertisement quoted in John J. Keville, "Third Annual Salute to the Plastics Industry, January 12-February 20, 1981," 47, script from radio station WLMS, Leominster, Mass., provided by John J. Keville.
49. Christopher Flavin, *The Future of Synthetic Materials: The Petroleum Connection*, Worldwatch Paper 36 (Washington: Worldwatch Institute, April 1980), 41, 7, 37–38, 46.
50. Richard D. Lyons, "Study Finds Synthetics a Benefit To Man Despite Petroleum Use," *New York Times*, 27 April 1980, 20; Sidney Gross, "What Next for the Plastics Industry," *Modern Plastics* 50 (October 1973): 61; Ralph L. Harding Jr., "Positive Perspective," 7 August 1972, typescript, VP Reading File.
51. Sidney Gross, "Image, Please," *Modern Plastics* 46 (August 1969): 43, and "What *Is* Plastics' Image, Anyway," *Modern Plastics* 47 (July 1970): 66.
52. Sidney Gross, interview by author, 9 December 1986. The quotation is from Sidney Gross, "Plastics Age Arrives Early," *Modern Plastics* 57 (February 1980): 45.
53. Kit Pedler and Gerry Davis, *Mutant 59: The Plastic-Eaters* (New York: Viking, 1972), 109.